

CLAIMS:

1. An apparatus for communicating a link state routing protocol with nodes in a network, comprising:

- 5 a controller having at least one processor associated therewith for performing route calculation and maintaining a link state database of said network; and
- at least one delegate port card coupled to said controller and having at least one separate processor associated therewith, said delegate port card having selected software functionality of said link state routing protocol assigned thereto, said delegate port card operable to process communications associated with said selected software
- 10 functionality substantially independently of said controller.

2. The apparatus of Claim 1, wherein said routing protocol is selected from the group consisting of OSPF, PNNI and ISIS.

- 15 3. The apparatus of Claim 1, wherein said controller is updated when a state change therefor occurs.

4. The apparatus of Claim 1, wherein said delegate port card is operable to distribute link state advertisements assigned thereto and to perform acceptance checks
- 20 for said link state messages served thereby.

5. The apparatus of Claim 1, wherein said delegate port card is operable to process incoming LSA updates.

- 25 6. The apparatus of Claim 1, wherein said delegate port card is operable to perform refresh functionality for associated LSAs.

7. The apparatus of Claim 1, delegate port cards are operable to provide retransmission timers and acknowledgements for LSA updates.

8. The apparatus of Claim 1, wherein sending and receiving of hello packets is performed by the delegate port card.

5 9. The apparatus of Claim 1, wherein neighbor finite state machines are synchronized between said controller and said delegate port card, said controller being updated by said delegate port card upon a new event being generated for said neighbor finite state machine.

10 11. The apparatus of Claim 1, wherein a LSA flood is initiated by said controller broadcasting said LSA to all port cards, wherein said port cards provide retransmission and acknowledgement service related thereto.

15 12. The apparatus of Claim 1, wherein said controller floods a tic timer to all delegate port cards.

13. The apparatus of Claim 12, wherein said delegate port cards send an acknowledgement after a given number of tics being received.

20 14. The apparatus of Claim 1, wherein LSA updates from delegate port cards are preprocessed before being sent to said controller.

25 15. A distributed processing apparatus for enabling distributed functionality of OSPF to be handled by delegate processors of a router, said router including a controller having at least one processor performing route calculation and maintaining a link state database in connection with a network, said apparatus comprising:

one or more communication ports for communicating to nodes in said network of said router; and

at least one processor operable to perform selected OSPF functionality substantially independent of said controller, said controller being updated upon receipt by said port card of an altering event to a state machine in said controller.

5 16. The apparatus of Claim 1, wherein said delegate port card is operable to distribute link state advertisements assigned thereto and to perform acceptance checks for said link state messages served thereby.

10 17. The apparatus of Claim 1, wherein said delegate port card is operable to process incoming LSA updates.

18. The apparatus of Claim 1, wherein sending and receiving of hello packets is performed by the delegate port card.

15 19. A method for communicating an intra-autonomous system link state routing protocol with nodes in a network, said method comprising:
performing route calculation and maintaining a link state database of said network on at least one processor of a controller device; and
providing selected software functionality of said intra-AS link state routing
20 protocol on a distributed basis using a distributed processor operable to process communications associated with said selected software functionality substantially independently of said controller.

25 20. The method of Claim 19, wherein said controller is updated upon receipt by said distributed processor of an altering event to a state machine in said controller.